Docket No.: 1152-0325PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Toshio NOMURA et al.

Application No.: NEW	Confirmation No.: N/A
Filed: September 26, 2005	Art Unit: N/A
For: 3-DIMENSIONAL IMAGE CREATING APPARATUS, 3-DIMENSIONAL IMAGE REPRODUCING APPARATUS, 3-DIMENSIONAL IMAGE PROCESSING APPARATUS, 3-DIMENSIONAL IMAGE PROCESSING PROGRAM AND RECORDING MEDIUM RECORDED WITH THE PROGRAM	Examiner: Not Yet Assigned

LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The PTO is requested to use the amended sheets/claims attached hereto (which correspond to Article 19 amendments or to claims attached to the Written Request (Article 34)) during prosecution of the above-identified national phase PCT application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §1.16 or 1.14; particularly, extension of time fees.

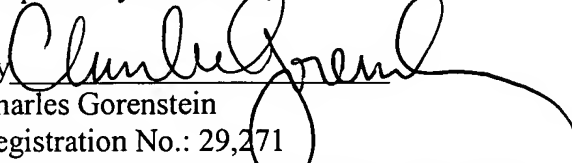Birch, Stewart, Kolasch & Birch, LLP   CG/clb

Application No.: NEW

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Dated: September 26, 2005

Respectfully submitted,

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Attachment(s)

CG/clb

<The Amendment under PCT Article 34 made on February 17, 2005>

Written Amendment
(Amendment made based on Article 11 of Law Concerning the International Application of the Patent Cooperation Treaty and Related Matters, equivalent to Article 34 (2) (b) of Patent Cooperation Treaty)

To Commissioner of the Patent Office
(To Examiner Nobuyoshi SAKAI)

1. Indication of the International Application

     PCT/JP2004/005484

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4.   Object to be amended

(1) The section "Best Mode for Carrying Out the Invention"
in the specification

(2) Claims

5.   Content of the amendment (cf. Appended paper)

(1) Specification, page 52, lines 6-7, delete "The
embodiment of the present invention will be described
hereinbelow with reference to the drawings."

(2) Specification, page 63, line 6, change "the amount of
bidashi" to --the amount of protrusion--.

(3) Specification, page 65, line 9, change "The fourth
embodiment" to --The eleventh embodiment--.

(4) Specification, page 67, lines 2-3, change "dedicated
warning indicator" to --dedicated warning display unit--.

(5) Claim 7, line 3, change "in which stereoscopic view is
permitted " to --suitable for a stereoscopic view--.

        Claim 7, lines 5-8 in Claim 7, change "and a decision
means for deciding whether the parallax quantity of the
3-dimensional image falls within the parallax range" to --a
decision means for deciding whether the parallax quantity

of the 3-dimensional image falls within the parallax range; and a warning means for warning a user, wherein the warning means warns the user when the decision means determines that the parallax quantity falls out of the parallax range--.

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(6) Claim 8, line 3, change "in which a stereoscopic view is permitted" to --suitable for a stereoscopic view--.

Claim 8, lines 7-10, change "and a decision means for deciding whether the parallax quantity of the 3-dimensional

10 image that has been enlarged or reduced based on the ratio falls within the parallax range" to --a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range; a parallax adjustment means for adjusting the parallax quantity of the 3-dimensional

15 image; and a designating means for designating an observable point for adjustment of the parallax quantity, wherein the parallax adjustment means adjusts the parallax quantity giving priority to an area around the observable point when the decision means determines that the parallax quantity falls

20 out of the parallax range--.

(7) Claim 9, lines 2-3, change "wherein the decision means makes a deciding process based on a partial area of the 3-dimensional image" to --further comprising a magnification

25 ratio selecting means for displaying an enlarged or reduced

view of the 3-dimensional image, wherein the decision means

determines whether the parallax quantity of the 3-dimensional

image that has been enlarged or reduced based on a selected

magnification ratio falls within the parallax range--.

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(8)   Claim 10, lines 2-4, change "further comprising a warning

means for warning a user when the decision means determines

that the parallax quantity falls out of the parallax area"

to --wherein the decision means makes a deciding process based

10   on a partial area of the 3-dimensional image--.

(9)   Claim 11, Cancelled.

(10) Claim 12, line 2, change "Claims 7 to 11" to --Claims

15   7 to 10--.

(11) Claim 13, line 2, change "Claims 7 to 11" to --Claims

7 to 10--.

20   (12) Claim 14, line 2, change "Claims 7 to 11" to --Claims

7 to 10--.

(13) Claim 15, lines 3-4, change "in which a stereoscopic

view is permitted" to --suitable for a stereoscopic view--.

25   Claim 15, lines 5-8 in Claim 7, change "and a decision

means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range" to --a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range;

5   and a warning means for warning a user, wherein the warning means warns the user when the decision means determines that the parallax quantity falls out of the parallax range--.

(14) Claim 16, lines 3-4 in Claim 16, change "in which a

10   stereoscopic view is permitted" to --suitable for a stereoscopic view--.

Claim 16, lines 5-10 in Claim 16, change "a ratio acquisition means for acquiring a ratio for enlargement or reduction of the 3-dimensional image; and a decision means

15   for deciding whether the parallax quantity of the 3-dimensional image that has been enlarged or reduced based on the ratio falls within the parallax range" to --a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range; a

20   parallax adjustment means for adjusting the parallax quantity of the 3-dimensional image; and a designating means for designating an observable point for adjustment of the parallax quantity, wherein the parallax adjustment means adjusts the parallax quantity giving priority to an area around the

25   observable point when the decision means determines that the

parallax quantity falls out of the parallax range--.

(15) Claim 17, lines 2-3, change "wherein the decision means makes the deciding process based on a partial area of the 3-dimensional image" to --characterized by making a computer further function as a magnification ratio selecting means for displaying an enlarged or reduced view of the 3-dimensional image, wherein the decision means determines whether the parallax quantity of the 3-dimensional image that has been enlarged or reduced based on a selected magnification ratio falls within the parallax range--.

(16) Claim 18, lines 2-5, change "characterized by making the computer function as a warning means ... out of the parallax area" to --wherein the decision means makes a deciding process based on a partial area of the 3-dimensional image--.

(17) Claim 19, cancelled.

(18) Claim 20, line 2, change "Claims 15 to 19" to --Claims 15 to 18--.

(19) Claim 21, line 2, change "Claims 15 to 19" to --Claims 15 to 18--.

(20) Claim 22, line 2, change "Claims 15 to 19" to --Claims 15 to 18--.

(21) Claim 23, line 2, change "Claims 15 to 22" to --Claims 15, 16, 17, 18, 20, 21 and 22--.

6.   List of the appended documents:

(1)   Amended pages of Specification

      Pages 52, 63, 65, and 67   One copy for each

(2)   Amended pages of Claims

      Pages 68-74, 74/1   One copy for each

superimposed upon display of thumbnails, instead of its being recorded in the thumbnail image. Use of thumbnail display as shown in FIG. 25 allows for both checking of the image content with a distortion-free image and confirmation of the

5   actual image form recorded as a primary image.

<The eighth embodiment>

In the eighth embodiment of the present invention, using

10   GUI application software for 3-dimensional image display, a personal computer (to be abbreviated as PC, hereinbelow) implements a stereoscopic display process to implement stereoscopic display on a stereoscopic display. Specifically, the CPU on the PC performs processing of a motion

15   picture and/or a still image, in accordance with the stereo display application software recorded on a recording medium such as a CD-ROM, hard disk and the like, to implement stereoscopic display on the stereoscopic display. Further, as the user gives instructions for stereo processing through

20   a mouse or a keyboard, the CPU executes the process based on the instructions.

FIG. 29 is a diagram for explaining a display image on a stereoscopic display of the eighth embodiment, in which a management display image 2 is displayed on display 1 by

25   the 3-dimensional image display application. Management

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in FIG. 35 is implemented. The flow of this process will be described with reference to the flowchart shown in FIG. 35.

At Step S21, the parallax quantity acquisition area in a target 3-dimensional image to be processed is initialized

5   with the entire image.

At Step S22, the amount of protrusion and the amount of depth are compared every pixel in the parallax quantity acquisition area to acquire the maximum amount of protrusion f' and the maximum amount of depth b' in the parallax quantity

10   acquisition area. In the present embodiment, it is assumed that the information on the amount of protrusion and the amount of depth for every pixel of the image is given in advance as tag information. However, there is a method of automatically determining the amounts for each pixel by stereo

15   matching, meaning that the method of acquisition is not limited to use of tag information. Alternatively, it is not necessary to earn the amounts of protrusion and depth for all pixels; these values may be extracted from some distinctive pixels in the parallax quantity acquisition area.

20   At Step S23, it is determined whether a stereoscopic view can be obtained by adjusting the parallax quantity by shifting the 3-dimensional image as a whole. It is possible to create display of a comfortable stereoscopic view by setting back the entire 3-dimensional image from the stereoscopic

25   display with a shift of f-th_f' as shown in FIG. 34. However,

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to that observable point and its vicinity, whereby it is possible to create display of a comfortable stereovision.

<The eleventh embodiment>

Any of the embodiments described heretofore is not limited to execution on the applications on PCs, but is executable on TV apparatus, PDAs, cellular phones and others. Application to these will be described hereinbelow as the eleventh embodiment of the present invention.

The eleventh embodiment is composed of, as shown in FIG. 38, a 3-dimensional image data source 10, a temporary data processing storage 11, a 3-dimensional image display unit 12, a magnification ratio selector 13, a parallax adjustment unit 14 and a warning decision unit 15 and a warning display unit 16.

First, color data and parallax data of 3-dimensional image data for every pixel from 3-dimensional image data source 10, and the size and resolution of the display device and the magnitude of crosstalk from 3-dimensional image display unit 12, are delivered and stored in data processing storage 11. Here, as a 3-dimensional image data source 10, a magnetic disk, semiconductor memory, data transmission via a wired or wireless network, and others can be considered. As a temporary data processing storage, a semiconductor memory, magnetic disk and others built into PDAs, cellular phones etc., can be considered.

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unit 12 to give a warning.

Warning may be given using a separate dedicated warning display unit other than 3-dimensional image display unit 12 or may be given with warning sound or the like by using a

5   speaker or headphone.

Industrial Applicability

The present invention provides a 3-dimensional image creating apparatus and a 3-dimensional image processing

10   apparatus for displaying 3-dimensional images, and enables the user to confirm the content of 3-dimensional images in a proper manner and is suitable for an apparatus that presents the content of a 3-dimensional image to the user even if it is enlarged or reduced.

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CLAIMS

1.   A 3-dimensional image creating apparatus comprising:

a primary image creator for creating a primary image of image information for multiple viewpoints;

a thumbnail image creator for creating a thumbnail image;

a 3-dimensional control information creator for creating 3-dimensional control information for implementing 3-dimensional display of the primary image; and

a multiplexer for multiplexing the primary image, the thumbnail image and the 3-dimensional control information.

2.   The 3-dimensional image creating apparatus according to Claim 1, wherein the thumbnail image creator creates the thumbnail image by directly reducing the primary image.

3.   The 3-dimensional image creating apparatus according to Claim 1, wherein the thumbnail image creator creates the thumbnail image by extracting a section of one viewpoint image from the primary image.

4.   The 3-dimensional image creating apparatus according to Claim 1, wherein the thumbnail image creator embeds a symbol that indicates an inclusion of a 3-dimensional image into the thumbnail image.

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5.   The 3-dimensional image creating apparatus according to Claim 1, wherein the thumbnail image creator creates the thumbnail image made up of a reduced image of the primary image and a reduced image of one viewpoint image extracted from the primary image and fitted therein in a picture-in-picture manner.

6.   A 3-dimensional image reproducing apparatus, comprising:

a demultiplexer for separating a primary image data, a thumbnail data and a 3-dimensional control information from an input image data; and

a thumbnail creator for outputting a thumbnail with a symbol that indicates an inclusion of a 3-dimensional image overlaid on the thumbnail data when the primary image data represents a 3-dimensional image.

7. (Amended)   A 3-dimensional image processing apparatus, comprising:

a parallax range acquisition means for acquiring a parallax range suitable for a stereoscopic view;

a parallax quantity acquisition means for acquiring a parallax quantity of a 3-dimensional image;

a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax

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range; and

a warning means for warning a user,

wherein the warning means warns the user when the decision means determines that the parallax quantity falls out of the

5   parallax range.

8. (Amended)   A 3-dimensional image processing apparatus, comprising:

a parallax range acquisition means for acquiring a

10   parallax range suitable for a stereoscopic view;

a parallax quantity acquisition means for acquiring a parallax quantity of a 3-dimensional image;

a ratio acquisition means for acquiring a ratio for enlargement or reduction of the 3-dimensional image;

15   a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range;

a parallax adjustment means for adjusting the parallax quantity of the 3-dimensional image; and

20   a designating means for designating an observable point for adjustment of the parallax quantity,

wherein the parallax adjustment means adjusts the parallax quantity giving priority to an area around the observable point when the decision means determines that the parallax

25   quantity falls out of the parallax range.

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9. (Amended)   The 3-dimensional image processing apparatus according to Claim 7 or 8, further comprising a magnification ratio selecting means for displaying an enlarged or reduced view of the 3-dimensional image, wherein the decision means determines whether the parallax quantity of the 3-dimensional image that has been enlarged or reduced based on a selected magnification ratio falls within the parallax range.

10. (Amended)   The 3-dimensional image processing apparatus according to any one of Claims 7 to 9, wherein the decision means makes a deciding process based on a partial area of the 3-dimensional image.

11.   (Cancelled)

12.   (Amended)   The 3-dimensional image processing apparatus according to any one of Claims 7 to 10, wherein the parallax quantity acquisition means uses a resolution of a stereoscopic display for displaying the 3-dimensional image, a size of a stereoscopic display for displaying the 3-dimensional image, or a resolution and size of a stereoscopic display for displaying the 3-dimensional image.

13.   (Amended)   The 3-dimensional image processing apparatus

according to any one of Claims 7 to 10, wherein the parallax range acquisition means uses a capability of separating left and right images of a stereoscopic display for displaying the 3-dimensional image.

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14. (Amended)   The 3-dimensional image processing apparatus according to any one of Claims 7 to 10, wherein the parallax quantity acquisition means uses data previously tagged to the 3-dimensional image.

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15. (Amended)   A 3-dimensional image processing program characterized by making a computer function as a parallax range acquisition means for acquiring a parallax range suitable for a stereoscopic view; a parallax quantity acquisition means for acquiring a parallax quantity of a 3-dimensional image; a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range; and a warning means for warning a user, wherein the warning means warns the user when the decision means determines that the parallax quantity falls out of the parallax range.

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16. (Amended)   A 3-dimensional image processing program characterized by making a computer function as a parallax range acquisition means for acquiring a parallax range

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suitable for a stereoscopic view; a parallax quantity acquisition means for acquiring a parallax quantity of a 3-dimensional image; a decision means for deciding whether the parallax quantity of the 3-dimensional image falls within the parallax range; a parallax adjustment means for adjusting the parallax quantity of the 3-dimensional image; and a designating means for designating an observable point for adjustment of the parallax quantity, wherein the parallax adjustment means adjusts the parallax quantity giving priority to an area around the observable point when the decision means determines that the parallax quantity falls out of the parallax range.

17. (Amended) The 3-dimensional image processing program according to Claim 15 or 16, characterized by making a computer further function as a magnification ratio selecting means for displaying an enlarged or reduced view of the 3-dimensional image, wherein the decision means determines whether the parallax quantity of the 3-dimensional image that has been enlarged or reduced based on a selected magnification ratio falls within the parallax range.

18. (Amended) The 3-dimensional image processing program according to any one of Claims 15 to 17, wherein the decision means makes a deciding process based on a partial area of

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the 3-dimensional image.

19.   (Cancelled)

20. (Amended)   The 3-dimensional image processing program according to any one of Claims 15 to 18, wherein the parallax quantity acquisition means uses a resolution a stereoscopic display for displaying the 3-dimensional image, a size of a stereoscopic display for displaying the 3-dimensional image, or a resolution and size of a stereoscopic display for displaying the 3-dimensional image.

21. (Amended)   The 3-dimensional image processing program according to any one of Claims 15 to 18, wherein the parallax range acquisition means uses the capability of separating the left and right images of a stereoscopic display for displaying the 3-dimensional image.

22. (Amended)   The 3-dimensional image processing program according to any one of Claims 15 to 18, wherein the parallax quantity acquisition means uses data previously tagged to the 3-dimensional image.

23. (Amended)   A computer readable recording medium having a program according to any one of Claims 15, 16, 17, 18, 20,

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21 and 22 recorded therein.